

Algorithm for Analyzing Optimal Mask Movement Pattern in Moving Mask Deep X-ray Lithography (M²DXL)

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Abstract

Moving mask deep X-ray lithography has demonstrated its feasibility for fabricating some 3-dimensional (3D) microstructures. In this technique, the determination of mask movement pattern is crucial for realizing the desired target microstructures. For theoretical determination of optimal mask movement patterns, an algorithm exploiting the Fourier transformation technique called "Inverse approach" was proposed. As a first step towards the completion of the inverse approach, the algorithm limited to the 2 space dimensions, vertical and lateral, was developed. Straightforward application of the inverse approach to the fabrication of V-shaped grooves did not yield any satisfying result. Therefore, an adopted version of the inverse approach algorithm, which ultimately allowed successful fabrication of the V-shaped groove, was proposed. Furthermore, it was shown that this algorithm could be applied to determine of an optimal mask pattern.

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